Non-soil Fumigation

A National Pesticide Applicator Study Manual

PERC
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Introduction

Purpose of This Manual

The purpose of this training manual is to provide study material for people interested in becoming a certified pesticide applicator in the non-soil fumigation treatment category in their respective states, Indian tribes or U.S. territories. It covers the basic knowledge and skills required to safely, effectively and correctly apply non-soil fumigants to structures, commodities and other sites. Also included is information on specific fumigant uses (e.g., commodity fumigation, transport fumigation and more) and pests that can be controlled with fumigants.

Non-soil fumigation is separated from soil fumigation because many of the techniques are unique to each use. Some of the rules and laws are also different between soil and non-soil fumigation. If you wish to use soil fumigants, that is usually a separate certification category in most states.

Information in this manual supplements the basic pesticide law and safety information provided in the National Core Manual (or your state's core or base manual). The aim of both core and specific use manuals are to help people learn to handle pesticides correctly so they protect themselves, coworkers, the general public and the environment from adverse effects of pesticides.

This manual is an entry-level text focusing on important terms, concepts, and labeling language. It is not to be used as a step-by-step guide to application. The methods and chemical references described here are not a substitute for pesticide label directions. Simply reading this manual does not qualify you as a fully-trained non-soil fumigant pesticide applicator. A competently trained applicator must also learn through on-the-job experience and continuing education. This manual does not:

- Contain product-specific directions for use. Always read and follow the pesticide product label, which is a legally binding document. Note that some state laws may supersede label directions if the state law is more restrictive.
- Advocate pesticide use over other means of pest management. This manual focuses on the safe and proper use of pesticides by people who have already determined that they are necessary in a given situation.

Also, since pesticide products, equipment, technologies, laws and regulations are constantly changing, certified applicators must keep up to date. Pesticide applicator recertification (i.e., continuing education) sessions and professional organization meetings offer these opportunities.

How to Study for the Exam

Carefully read the entire manual. This may seem obvious, but some people skip over information they think they know. However, they may not know it as well as they think. State pesticide applicator certification exam questions are developed from—and supported by—this manual. Any text in the manual, even in the glossary, is information you can be tested on. Even if you have extensive on-the-job experience or have taken a certification exam prep course, you should study the manual. Studying increases your chances of passing the pesticide applicator certification exam. Here are some tips on how you can study for your certification exam that may help you to pass the test.

- Study one part of the manual until you have a grasp of the information before moving on, it will help make studying more manageable. Break the manual up into sections. Study a chapter or two each day for several weeks before the exam. Review any material that you find difficult.
- You may want to use a highlighting marker to mark those areas in the chapter that are related to the learning objectives.
- You could also make flash cards, writing the questions on the front with the answers on the back and review them yourself, or have a friend or family member quiz you. Sometimes the act of writing down information helps you better retain that information.

- Read the learning objectives that begin each chapter. The learning objectives are your key to passing the certification exam because they are what the exam is based on. Read each objective before starting on the chapter itself. Keep the learning objectives in mind while reading each chapter. Afterwards, try to respond to each objective in writing. If you have trouble, reread the area of the chapter on that topic. Do this for all the learning objectives.

Exam Tips

- Contact the certifying agency within your state, Indian tribe, or U.S. territory for testing locations and times. Some locations offer both computerized and paper testing; others are limited to one or the other.
- After choosing a testing site, find out what you need to bring. Some testing centers provide calculators, scratch paper, and/or pencils; others prohibit any outside materials. Be prepared.
- Many places require you to bring a photo identification and Notice of Authorization letter with you to take an exam at any location.
- When taking the exam, read each question carefully. Make sure to read all of the words and understand their meanings. Misreading questions is a common cause of exam errors.
- Certification exams include two general types of questions. The first tests your ability to recall facts. The second assesses your ability to apply what you know. For example, the second type of question might ask you to evaluate a set of conditions and make a decision.

CHAPTER 1

Fumigant Basics

LEARNING OBJECTIVES

- ☑ **Explain what a fumigant is and specify what makes fumigants different from other pesticides.**
- ☑ **Explain how fumigants change from a liquid or a solid into a gas.**
- ☑ **Outline the chemical characteristics of fumigants.**
- ☑ **Describe and explain the factors that affect movement of fumigants through an application site.**
- ☑ **List the common fumigants used for non-soil fumigation.**
- ☑ **Describe characteristics of those common fumigants.**
- ☑ **Discuss the importance of proper pest identification.**
- ☑ **Explain which pest factors determine if the target pest can be controlled with fumigation.**
- ☑ **Explain the importance of choosing the proper application rate and timing of application.**

Terms to Know

The following are important terms to know from this chapter. They are explained and *italicized* in the text and defined in the glossary at the end of this manual.

Absorb / Absorption	Desorption	Molecular Weight	Toxic
Aerate / Aeration	Diffuse / Diffusion	Particulate	Vapor
Aerosol	Flammability	Pesticide	Vapor Pressure
Boiling Point	Fumigant	Solubility	Volatile
Chemical reactivity	Fumigation	Sorption	Volatility
Concentration	Gas / Gases	Specific Gravity	Volatilization
Corrosive	Molecules	Stratify	Warning Agent

This manual deals with non-soil *fumigations* (NSF). Sometimes, these types of applications are known as "structural" fumigations, because they often take place inside a structure (e.g., house, factory, railcar, ship, etc.), but it also can include rodent burrow fumigations and sewer pipes. Even though rodent burrows and sewer pipes are in soil, the term "soil fumigation" is reserved for broad applications to agricultural fields. Many of the chemical and physical properties of both NSF and soil fumigants are the same. Indeed, some of the same chemicals are used for both. However, this manual, again, focuses only on non-soil fumigation procedures.

What is a Pesticide?

Many people mistakenly use the words "insecticide" and "pesticide" interchangeably. However, the word "pesticide" is a broad term that covers many substances. Insecticides are just one specific type of pesticide. The "cide" part of the word comes from Latin meaning "to kill." Therefore, a pesticide kills pests—a broad category because those pests could be insects, weeds, fungi, mice, or other organisms we consider pests. If we are trying to control weeds, we would use an herbicide. For fungi, we use a fungicide, insecticides are aimed at insects and rodenticides at rodents. All of these are pesticides under the definition stated above. These are just four examples of the many types of pesticides in use today.

What Is a Fumigant?

Before we discuss *fumigants*, we need to define the broader term—*pesticide*. A pesticide is any substance used to directly control pest populations or to prevent or reduce pest damage. Not all pesticides actually kill the target pest—some may only inhibit its growth, repel it, or reduce its capacity to reproduce.